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Rhinitis medicamentosa – comparing two treatment strategies: a retrospective analysis

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Abstract

Objective. Rhinitis medicamentosa poses a therapeutic challenge for both patients and physicians. Treatment strategies vary, starting with avoidance of decongestants, followed by medications or surgical intervention. This study aimed to compare two treatment strategies for this condition.

Methods. A review was conducted of patients diagnosed with rhinitis medicamentosa from 2013 to 2021, who were managed conservatively with medications or surgically by inferior turbinate reduction.

Results. Forty-seven patients were included: 21 patients were treated conservatively and 26 underwent turbinate reduction. Following surgical therapy, the frequency of using decongestants was significantly reduced ($p < 0.001$), with a significant improvement in Sino-Nasal Outcome Test-22 scores ($p < 0.001$). The conservative treatment group was significantly older with more co-morbidities. Following medical therapy, the conservative treatment group had a significant decrease in the frequency of decongestant use, but there was no significant improvement in their Sino-Nasal Outcome Test-22 scores.

Conclusion. Compared to conservative treatment, inferior turbinate reduction for rhinitis medicamentosa resulted in reduced decongestant use and improved quality of life.

Main Article

Itai Margulis takes responsibility for the integrity of the content of the paper

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Introduction

Rhinitis medicamentosa is defined as a drug-induced, non-allergic form of rhinitis that is associated with the prolonged use of topical vasoconstrictors (decongestants).[1]

Rhinitis medicamentosa incidence ranges from 1 to 9 per cent, peaking in young and middle-aged adults, with an equivalent male-to-female ratio. The pathophysiological mechanisms underlying rhinitis medicamentosa are unclear. One theory is that long-term use of topical decongestants leads to the up-regulation of alpha-adrenergic receptors and tachyphylaxis. The result is a shorter duration of drug action, an increased dose and frequent application for therapeutic effect, and the rebound swelling of the inferior turbinates after the decongestive effect ends.[2–4]

The timing of rhinitis medicamentosa onset is unknown, and has been reported to occur from 3 days to 8 weeks after the continuous use of topical decongestants.[1,2]

Patients experience nasal stuffiness, swelling and discomfort. In one study, the most common complaint was psychological addiction, in 95 per cent of patients, with reported restlessness, headaches and anxiety after discontinuing the drug. Rebound congestion led to insomnia, xerostomia, sore throat, snoring and epistaxis.[2]

The first and most important treatment is avoiding the use of decongestants. Both an abrupt withdrawal and a weaning approach are accepted. Intranasal steroids can be applied to alleviate rebound swelling of the nasal mucosa and expedite recovery.[1,2] Nasal saline is another option as an adjunctive treatment.[3] However, the disease can be therapy-resistant and many patients fail to discontinue the drug.[2]

This study aimed to compare two treatment strategies for patients with rhinitis medicamentosa, using either medical therapy (topical with or without systemic medications) or endoscopic bilateral inferior turbinoplasty.

Materials and methods

Population

A retrospective cohort study was conducted of patients diagnosed with rhinitis medicamentosa, from 2013 to 2021, who were treated in the Department of Otolaryngology – Head and Neck Surgery, at Carmel Medical Center, Haifa, Israel, and at its out-patient clinics. There is no International Classification of Diseases, ninth revision ('ICD-9') code for rhinitis medicamentosa; therefore, patients' files were pulled out of the medical registry according to the following International Classification of Diseases, ninth revision

codes for: chronic rhinitis (code: 472.0), hypertrophy of nasal turbinates (code: 478.0), allergic or vasomotor rhinitis (code: 477.9), and nasal obstruction (code: 478.19). The inclusion criteria were adult patients (aged over 18 years) diagnosed with rhinitis medicamentosa as the cause for their nasal obstruction or complaints, who attended at least two recorded follow-up visits.

Rhinitis medicamentosa was diagnosed according to nasal complaints, such as nasal blockage or congestion, which were associated with chronic use of topical decongestants in the absence of other aetiologies.

The exclusion criteria were patients with an underlying sinonasal disease, such as deviated nasal septum, infective rhinitis, chronic rhinosinusitis, and benign or malignant sinonasal tumour. In addition, patients who had undergone previous sinus, septal or turbinate surgery were excluded.

The study was approved by the institutional review board according to the Helsinki Declaration.

Allocation and intervention

Patients were divided into two groups according to the intervention executed: a conservative treatment group and a surgical treatment group.

The conservative treatment group comprised patients who were treated topically with or without systemic medications, and without surgical intervention.

All patients received a thorough explanation during their first visit regarding the harmful effects of using decongestants. They were encouraged to stop using decongestants in a stepwise manner, and to use any of the following adjunctive medical therapies: intranasal corticosteroids, intranasal or systemic antihistamines, and saline rinses. The shortest time recommended for medical therapy was two months, before a surgical therapy was offered. Patients who declined surgery, or who were considered as high risk for general anaesthesia because of co-morbidities or American Society of Anesthesiologists physical status classification, continued medical therapy until the end of follow up.

The surgical treatment group consisted of patients in whom medical treatment had failed after a minimum period of two months, who were offered surgical treatment in the form of inferior turbinate surgery, using the same technique (endoscopic bilateral turbinoplasty), performed in our department. Medical treatment failure was defined as the continuation of decongestant use despite the adjunctive therapy, and no symptomatic improvement.

We performed turbinoplasty utilising the medial flap technique, using Metzenbaum or Mayo scissors for removing inferior turbinate bone, inferior and lateral mucosa. Haemostasis was achieved with bipolar electrocautery. A microdebrider was not used. Other inferior turbinate reduction techniques were not offered.

Outcomes

The primary outcome was withdrawal from decongestant use after intervention, either medical treatment or inferior turbinate surgery. The secondary outcome was a change in quality of life (QoL), according to symptom scores based on the validated Hebrew translation of the Sino-Nasal Outcome Test-22 (SNOT-22) questionnaire, before and after the intervention.[5] The SNOT-22 scores were not evaluated for the pre-operative period.

The following data were collected for each patient in both treatment groups: age, smoking status, co-morbidities, duration and frequency of decongestant use, type of and compliance with medical therapy prescribed, side effects, and post-operative complications. Decongestants were not recommended by the otolaryngologists, and were purchased and used according to patients' preferences.

Statistical analysis

Statistical analysis was performed using SPSS Statistics software, version 28 (IBM, Armonk, New York, USA). Continuous variables were presented as means and standard deviations, and/or medians with interquartile ranges. Categorical variables were described as percentages. Demographic and clinical characteristics of the two treatment groups were analysed and compared using the chi-square test for categorical variables, and the independent *t*-test or Mann–Whitney U test, as appropriate, for the continuous variables. Pre- and post-treatment differences in each group were assessed separately using the Wilcoxon signed rank test. A *p*-value of less than 0.05 was considered statistically significant.

Results

The study included 47 patients, with a mean age of 42.2 ± 16.5 years, of whom 24 (51.1 per cent) were male. The surgical treatment group had 26 patients and the conservative treatment group had 21 patients. Patients' characteristics are presented in Table 1.

The two groups were not homogeneous, as the conservative treatment group was older, with more co-morbidities and a longer follow-up period. Patients' allergies were self-reported and documented. Environmental allergies were reported by seven patients (14.8 per cent) in our cohort; allergens included house dust mites, eucalyptus trees, olive trees and other pollens. Out of 14 patients (29.7 per cent) who underwent allergy tests, 8 (17 per cent) tested positive for an allergen. No significant differences were found between groups regarding their reported environmental allergies rate, the number or type of allergy tests performed, and the positive allergy test result rates (Table 1).

Co-morbidities included: hypertension, hyperlipidaemia, diabetes, asthma, gastroesophageal or laryngopharyngeal reflux disease, ischaemic heart disease, and atrial fibrillation.

Younger patients with no co-morbid conditions were operated on in our ambulatory setting and discharged on the day of surgery. Other patients with co-morbidities were operated on in a hospital setting and were discharged on post-operative day 1. No major complications occurred in either group.

Baseline disease characteristics

Details of intranasal decongestant use and treatment outcomes are presented in Table 2.

There were no significant differences between the surgical and conservative treatment groups in terms of the duration of decongestant use at the beginning of follow up or in the baseline frequency of decongestant use before intervention (times per day). The baseline SNOT-22 scores, reported at the first visit, were similar in both groups (mean score of 35.83) (Table 2).

Outcomes following medical therapy

The duration of medical treatment was significantly shorter for the surgical treatment group than for the conservative treatment group in a parallel period (Table 2).

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Table 1. Patients' characteristics

Parameter	Cohort*	Surgical treatment†	Conservative treatment‡	*P*-value
Males (*n* (%))	24 (51.1)	12 (46.2)	11 (52.4)	0.671
Age (mean ± SD; years)	42.2 ± 16.5	37.6 ± 12.8	47.8 ± 19.0	0.033
Co-morbidities (*n* (%))	19 (40.4)	6 (23.1)	13 (61.9)	0.007
Active smokers (*n* (%))	13 (27.7)	9 (34.6)	4 (19.0)	0.236
Smoking pack-years (median (IQR))	7 (3.75; 16.5)	7 (3.75; 19)	6 (3.5; 13)	0.710
Reported seasonal allergies (*n* (%))**	7 (14.8)	3 (11.5)	4 (19.0)	0.684
Performed allergy tests (*n* (%))§	14 (29.7)	5 (19.2)	9 (42.8)	0.078
Positive allergy tests (*n* (%))§	8 (17)	2 (7.6)	6 (28.5)	0.580
Follow-up duration (median (IQR); months)#	18.9 (6.0; 41.2)	14.4 (5.2; 24.2)	37.6 (8.8; 84.0)	0.047

*$n = 47$; †$n = 26$; ‡$n = 21$. **Patients' self-reported allergies. §Allergy tests performed by an allergologist, either skin prick or blood (immunoglobulin E) test. #Follow-up duration measured as the time from the first visit to the last visit, after surgical or medical intervention. SD = standard deviation; IQR = interquartile range

No significant differences among groups were found in terms of the types of medical therapy taken as an adjunct to stepwise discontinuation of the decongestant. After asking patients about their compliance to the medical therapy recommended by the otolaryngologist, 15 (32.9 per cent) used intranasal corticosteroids alone, while 30 (63.8 per cent) used a

Table 2. Intranasal decongestant use and treatment outcomes

Parameter	Surgical ($n = 26$)	Conservative treatment ($n = 21$)	*P*-value
Medical therapy			
– None (*n* (%))	1 (3.8)	0	>0.99
– Intranasal corticosteroid (*n* (%))	9 (34.6)	6 (28.6)	0.659
– Intranasal antihistamines (*n* (%))	1 (3.8)	0	>0.99
– Combined medical therapy (*n* (%))*	15 (57.7)	15 (71.4)	0.330
– Duration of medical therapy (mean ± SD; months)	1.6 ± 1.5	7.8 ± 10.5	0.015
Baseline decongestant use (spray or drops)†			
– Mean ± SD duration of use (years)	5.9 ± 7.5	10.3 ± 13.4	0.283
– Median (IQR) duration of use (years)	2.75 (1; 9.25)	4 (1.24; 12.5)	
– Mean ± SD frequency of use per day	4.23 ± 4.06	2.85 ± 1.75	0.212
– Median (IQR) frequency of use per day	3 (2; 4.6)	2.5 (1.75; 4)	
Post-intervention decongestant use			
– Mean ± SD post-medical therapy frequency of use per day‡	3.96 ± 4.2	1.49 ± 1.5	0.005
– Median (IQR) post-medical therapy frequency of use per day‡	3 (1; 4.6)	1 (0; 2.75)	
– Mean ± SD change before *vs* after medical therapy	0.27 ± 0.68	1.37 ± 1.96	0.004
– Median (IQR) change before *vs* after medical therapy	0 (0; 0)	1 (0; 2)	
– Mean ± SD post-surgical therapy frequency of use per day**	0.04 ± 0.2	–	
– Median (IQR) post-surgical therapy frequency of use per day**	0 (0; 0)	–	
– Mean ± SD post-intervention frequency of use per day§	0.04 ± 0.2	1.49 ± 1.5	<0.001
– Frequency of use per day during last month of follow up (*n* (%))#	4 (15.4)	16 (76.2)	<0.001
SNOT-22 scores			
– Mean ± SD score at baseline†	35.9 ± 22.6	35.76 ± 22.1	0.898
– Median (IQR) score at baseline†	33 (19.25; 55)	31 (14; 57)	
– Mean ± SD score post-intervention	10.3 ± 20.8	32.3 ± 23.6	<0.001
– Median (IQR) score post-intervention	1.5 (0; 10.25)	27 (13; 52.5)	
– Mean ± SD change in scores	25.6 ± 20.1	3.48 ± 8.9	<0.001
– Median (IQR) change in scores	27.5 (5; 38.5)	0 (0; 2.5)	

*Combination of intranasal corticosteroids, antihistamines (intranasal or systemic) and saline rinses. †Before intervention, reported at first visit. ‡At the end of medical therapy, reported at last visit. **After bilateral medial flap, inferior turbinoplasty, reported at last visit. §Medical or surgical intervention. #Decongestant used to some degree. SD = standard deviation; IQR = interquartile range; SNOT-22 = Sino-Nasal Outcome Test-22

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combination of intranasal corticosteroids, antihistamines (intranasal or systemic) and saline rinses. One patient used intranasal antihistamines alone and one was non-compliant for any treatment recommended.

When comparing the frequency of decongestant use per day after medical therapy, the conservative treatment group had a significant decrease in the frequency of use as compared to baseline, with a lower frequency at the end of follow up as compared to the surgical treatment group prior to surgery (Table 2).

The SNOT-22 scores in the conservative treatment group were not significantly reduced after medical therapy as compared to baseline (mean difference of 3.48) (Table 2, Figure 1).

There were 16 patients (76 per cent) in the conservative treatment group who reported using decongestants, with any frequency, during the last month of follow up, as compared to 4 patients (15 per cent) in the surgical treatment group.

Outcomes following inferior turbinate surgery

Twenty-six patients underwent endoscopic bilateral medial flap inferior turbinoplasty (involving 52 inferior turbinates): 23 patients (88 per cent) underwent surgery under general anaesthesia, 2 (8 per cent) underwent surgery under local anaesthesia, and 1 (4 per cent) converted from local to general anaesthesia because of operative discomfort and pain.

In the surgical treatment group, all patients stopped decongestant use on the day of surgery.

At the end of follow up, four patients in the surgical treatment group (15 per cent) reported using decongestants to some degree during the previous month, during an upper respiratory tract infection, and not for more than 7 days.

Following surgery, the daily frequency of decongestant use was significantly lower for the surgical treatment group compared to the conservative treatment group (mean of 0.04 *vs* 1.49, respectively; $p < 0.001$) (Table 2).

In addition, the surgical treatment group had significantly lower SNOT-22 scores at the end of follow up, as compared to their baseline scores (Table 2, Figure 1).

We found no major intra-operative or post-operative complications among the 26 operated patients (52 inferior turbinates).

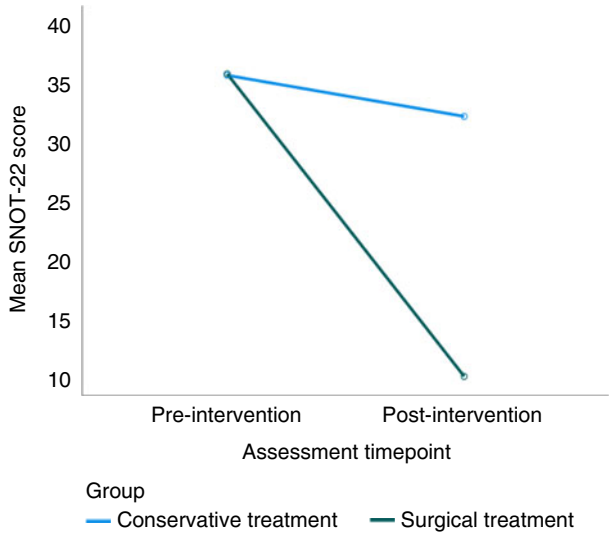

Figure 1. The change (mean difference) in the mean Sino-Nasal Outcome Test-22 (SNOT-22) scores from the first visit (pre-intervention) to the end of the follow-up period (post-intervention). Compared to the conservative treatment group (blue), the surgical treatment group (green) had significantly lower SNOT-22 scores at the end of follow up ($p < 0.001$).

Patients were discharged from hospital either on the same day (in ambulatory setting) or on post-operative day 1 (in a hospital setting). Nasal packing (8 cm of Merocel; Medtronic, Minneapolis, Minnesota, USA) was inserted into each nostril at the end of surgery and removed on post-operative day 1. Patients were advised to rinse their nose with saline three to six times a day, for a period of four weeks. They were invited for a follow-up visit at four to six weeks post-operatively.

Minor post-operative complications recorded at the follow-up visit are presented in Table 3.

Discussion

According to our study, rhinitis medicamentosa patients who underwent inferior turbinate surgery had better outcomes in terms of decongestant discontinuation and a reduction in SNOT-22 scores.

Patients and disease characteristics at baseline

The patients in our cohort used oxymetazoline or xylometazoline in different forms, which are commercially available over the counter in Israel. However, other decongestants may also cause rhinitis medicamentosa.[6]

The baseline characteristics of decongestant use before surgical or conservative intervention did not differ significantly (Table 2). Other studies presented a wide-ranging duration of decongestant use among rhinitis medicamentosa patients.[2,3,6,7]

The pathophysiological mechanisms of rhinitis medicamentosa are not yet completely understood, and so there is no consensus on treatment protocol. Histological, pharmacokinetic and pathophysiological studies are necessary to understand the mechanisms of rhinitis medicamentosa, which would inform investigators with regard to targeted treatments.[3]

Histological changes consistent with rhinitis medicamentosa include nasociliary loss, squamous cell metaplasia, epithelial oedema and goblet cell hyperplasia.[8]

Patients in both treatment groups did not differ significantly in terms of reported allergies and positive allergy test rates (Table 1). To the best of our knowledge, allergic rhinitis is not a risk factor for rhinitis medicamentosa. Nasal decongestants have been used worldwide to relieve nasal congestion such as allergic and non-allergic rhinitis.[2] According to US Food and Drug Administration recommendations, oxymetazoline hydrochloride should not be used for longer than 7 days, in order to avoid rhinitis medicamentosa.[9] A systematic review found no reports of tachyphylaxis or rebound congestion after treatment with a combination of intranasal corticosteroid spray and oxymetazoline hydrochloride for allergic rhinitis during 14–28 days.[9] Nasal decongestants are recommended together with intranasal corticosteroids for the management of acute rhinosinusitis, without an increased risk for developing rebound congestion after 10–30 days.[10]

Table 3. Minor complications among 26 surgical patients*

Minor complication	Patients (*n* (%))
Nasal crusting	9 (34.6)
Nasal discharge	2 (7.6)
Synechiae	1 (3.8)
None	14 (53.8)

*At three to five weeks post-operatively

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No significant differences were found between the surgical and conservative treatment groups in terms of smoking status (Table 1). Prolonged tobacco smoking has shown to cause mucociliary dysfunction and contribute to the development of rhinitis.[4] In one study, smoking correlated positively with decongestant abuse.[7] Li *et al.* reported similar baseline characteristics between patients who ceased nasal decongestants and those who continued use, following nasal surgery. However, they found a higher rate of asthma among patients in whom surgical therapy failed.[11]

There is a strong addictive component to rhinitis medicamentosa, including psychological dependence on nasal decongestants and withdrawal symptoms. A higher risk of opioid abuse was seen in rhinitis medicamentosa patients.[6]

Patients' reported outcomes

The primary outcome was withdrawal from decongestant use, with changes in QoL after intervention (*vs* before intervention) being a secondary outcome.[5] The high baseline SNOT-22 score of our cohort (mean score of 35.83 ± 22.2; Table 2) suggests that this condition significantly affects patients' QoL. In comparison, one study of rhinitis medicamentosa patients revealed a mean baseline SNOT-22 score of 40.3, and other studies of chronic rhinosinusitis patients reported a mean SNOT-22 score of 42.0, while a healthy control group had a mean score of 9.3.[11,12]

One may argue that the Nasal Obstruction Symptom Evaluation ('NOSE') scale is more accurate than the SNOT-22 scale, which was originally developed for evaluating chronic sinusitis.[12,13] We believe that the Nasal Obstruction Symptom Evaluation scale lacks some important questions that are relevant for rhinitis medicamentosa patients, such as waking up at night, waking up tired, and feeling frustrated, restless or embarrassed. We found that these parameters were significantly affected in rhinitis medicamentosa patients. Other studies used different symptom scores, such as nasal congestion visual analogue scale scores (of 1–10), Rhinitis Questionnaire Symptom Scores, Nasal Symptoms Scores, and the 'need' for topical decongestants.[3,11]

Outcomes following medical therapy

We did not use a uniform protocol for medical therapy. The most frequent regimen was a combination of intranasal corticosteroid and saline rinses, in parallel to weaning off from decongestant use (63.8 per cent of patients; Table 2). Similarly, in a survey of Canadian otolaryngologists, weaning off decongestants and intranasal corticosteroid use was the most common regimen for treating rhinitis medicamentosa (61 per cent of responders).[14]

The conservative treatment group showed a significant decrease in the frequency of decongestant use after medical therapy, in comparison to the surgical treatment group (Table 2). The surgical treatment group was non-responsive to medical therapy, which was the reason they had been referred for surgery. This may be an important prognostic factor for rhinitis medicamentosa patients that could be an indication for inferior turbinate surgery. A possible explanation is the significantly shorter treatment duration relative to the conservative treatment group (mean of 1.6 *vs* 7.8 months; Table 2). In addition, some patients referred for surgery stopped using topical medications earlier than recommended (two months).

The ideal duration of medical therapy for rhinitis medicamentosa has not yet been determined, because the level of evidence is weak, and no randomised controlled trials have been completed.[15]

A systematic review included studies with topical medical therapy durations of two weeks to two months.[3] A recent study presented lower rates of intranasal corticosteroid use by rhinitis medicamentosa patients before surgery.[11]

A randomised, placebo-controlled study of healthy subjects showed that nasal congestion resolved after the administration of fluticasone 200 µg twice daily for 3 days, despite continued use of a nasal decongestant.[15]

Another study evaluated the effect of fluticasone propionate (200 µg daily) versus placebo for 14 days on nasal congestion, nasal resistance, peak inspiratory flow and acoustic rhinomanometry after stopping nasal decongestants. Symptomatic improvement was observed on day 4 with corticosteroids and on day 7 with the placebo.[16]

The SNOT-22 scores in the conservative treatment group were not significantly reduced from baseline after medical therapy (Table 2, Figure 1). One possible reason is that some of the patients' co-morbidities, such as obstructive sleep apnoea syndrome, might have affected SNOT-22 scores as well.

Outcomes following inferior turbinate surgery

Twenty-six patients, refractory to medical therapy, underwent endoscopic bilateral medial flap inferior turbinoplasty. We did not offer other inferior turbinate reduction techniques, such as Coblation® or electrocautery.

The frequency of decongestant use following surgery was reduced significantly, and their mean use was significantly lower than in the conservative treatment group following medical therapy (Table 2).

Similarly, SNOT-22 score reductions were more significant following surgery as compared to after medical therapy (Table 2, Figure 1), reflecting the greater effect of surgery and a better QoL for those patients. The mean SNOT-22 postoperative score of 10.3 ± 20.8 was similar to that of the healthy control group with a mean score of 9.3, according to European Position Paper on Rhinosinusitis and Nasal Polyps 2020 reports.[17]

Li *et al.* examined the effect of nasal surgery on rhinitis medicamentosa patients, and showed similar findings for surgical intervention in terms of decongestant use (91 per cent cessation rate) and SNOT-22 scores (change = −27.1), before and after surgery. However, that study did not compare conservative treatment to surgical intervention, and included other types of nasal surgery, such as septoplasty and limited functional endoscopic sinus surgery to address middle turbinate contact points.[11]

Co-morbidities such as ischaemic heart disease, atrial fibrillation and hypertension might have affected the otolaryngologist's decision of whether to refer the patient for inferior turbinate surgery; however, this is debatable. Turbinate surgery is considered safe, with a low rate of major complications.[18] Several techniques of turbinate surgery performed under local or general anaesthesia exist.[19]

Menezes *et al.* showed that septum and turbinate surgery performed under general anaesthesia are safe in the ambulatory setting, with a low rate of unexpected hospital revisits. No associations were found between prolonged hospital stay and co-morbidities or American Society of Anesthesiologists physical status classification.[18]

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Other surgical techniques for inferior turbinate surgery have been shown to be safe for co-morbid and older patients when performed under local anaesthesia. Age and the presence of a pulmonary co-morbidity did not significantly influence surgical outcomes.[20]

Our rate of minor complications post-operatively, mainly crusting, was somewhat higher than reported in other studies (Table 3).[21,22] A possible explanation is the relatively short interval between the surgery and the follow-up examination (mean of 3.2 weeks).

Barham *et al.* found that long-term outcomes of endoscopic medial flap inferior turbinoplasty were superior to those of submucosal electrocautery and submucosal powered turbinate reduction for the indication of nasal obstruction. Post-operative complications included pain requiring analgesia (14 per cent), and bleeding requiring nasal packing or surgical intervention (4 per cent).[22]

To the best of our knowledge, this is the first study to compare conservative treatment with surgical intervention for rhinitis medicamentosa. In addition, it is the first to examine the effect of endoscopic medial flap inferior turbinoplasty solely for the indication of rhinitis medicamentosa.

The limitations of our study include its retrospective character, the low number of patients and the heterogenicity of treatment groups. In addition, there was no identical treatment protocol for rhinitis medicamentosa, and there was a lack of objective measures such as acoustic rhinomanometry or peak nasal inspiratory flow.

Other medical and surgical interventions have shown promising results for rhinitis medicamentosa. One animal study found that xylitol is as effective as a nasal steroid when evaluating histopathological responses to treatment in rhinitis medicamentosa.[23] Future clinical studies should examine its efficacy in treating rhinitis medicamentosa. Another study showed the efficacy of nebulised hyaluronic acid spray in reducing the use of topical decongestant in rhinitis medicamentosa patients.[24]

Caffier *et al.* found that out-patient diode laser treatment for inferior turbinate reduction was highly effective, safe and well tolerated by patients, and 88 per cent of patients stopped decongestant use within six months post-operatively.[2]

- There is no consensus on the ideal treatment protocol for rhinitis medicamentosa in the literature
- Limited studies have shown decreased nasal decongestant use following nasal surgery
- In this study, conservative therapy in the form of nasal steroids was associated with decreased decongestant use
- However, conservative therapy was not associated with improved quality of life (QoL), as measured by Sino-Nasal Outcome Test-22 scores
- Inferior turbinate reduction surgery was associated with a significant reduction in decongestant use and improved QoL

Orabi *et al.* reported excellent symptomatic improvement and a low complication rate following potassium titanyl phosphate laser inferior turbinectomy for patients with allergic rhinitis and non-allergic rhinitis refractory to medical treatment.[21]

Conclusion

Compared to conservative treatment, surgical intervention in the form of endoscopic medial flap inferior turbinoplasty for rhinitis medicamentosa patients resulted in significantly reduced decongestant use and improved QoL. Further randomised controlled trials comparing medical treatment to primary surgery (without previous medical therapy), as well as different forms of conservative treatments, are required. In addition, defining the ideal protocol of medical therapy for rhinitis medicamentosa and identifying prognostic parameters for treatment failure are of utmost importance.

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Competing interests. None declared

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